

DECLARATION OF BYRON C. GABRIELSEN, Ph.D.

I, BYRON C. GABRIELSEN, Ph.D., declare and state as follows:

1. I am a consultant in the field of agronomy with over 20 years experience in irrigation management, water resource evaluation, soil remediation, and crop production. I have been licensed as a national and state Certified Crop Advisor (CCA Lic. #11190) since 1995. A current curriculum vitae detailing my qualifications and experience is attached to this declaration.

2. I have been retained by the Metropolitan Water District of Southern California (Metropolitan) to assist it in evaluating the amount of Colorado River water needed to satisfy reasonable and beneficial uses within the Imperial Irrigation District (IID).

3. My opinions, findings and conclusions concerning this matter are discussed in detail in the attached May 27, 2003 memorandum to Principal Engineer Kirk Dimmitt, Subject: Cropping patterns, yield trends, and evapotranspiration as a basis for water requirement estimates within Imperial Irrigation District.

4. The opinions, findings and conclusions detailed in the attached memorandum are based upon my own personal and professional knowledge of and expertise in the matters that are addressed and, if called as a witness, I could and would testify competently thereto.

I declare that the foregoing is true and correct and that this declaration was executed in Tulare County, California on May 28, 2003.



BYRON C. GABRIELSEN, Ph.D.

Consultant to Metropolitan in the areas of
agronomy and cropping

BYRON C. GABRIELSEN, Ph.D., CCA

5921 W. Crowley Court Visalia, CA 93291-5163 Office: (559) 739-7442 Fax: (559) 739-1222

AREAS OF EXPERTISE

Plant Physiology	Salinity Management	General crop production
Plant Nutrition	Soil Reclamation	Land Evaluation for Crops
Soil Fertility	Irrigation Management	Water Quality Assessment
Soil Management	Crop Evapotranspiration	Forage Quality Evaluation

EXPERIENCE

GABRIELSEN & ASSOCIATES, VISALIA, CALIFORNIA

Consulting Agronomist/Owner, 1994 to Present

Provide agronomic technical services for the agricultural production sector and related professions. Conduct agronomic investigation, evaluate soils, plants, and water resources, develop remediation and mitigation measures, and provide recommendations. Provide irrigation management services. Assess soils and lands for agricultural suitability. Evaluate and monitor general crop condition and nutritional status. Conduct technical analysis and provide litigation support on crop production, soil management, and related agronomic issues.

JMLORD, INC., FRESNO, CALIFORNIA

Technical Services Manager/Senior Consulting Agronomist, 1989 to 1994

Planned, implemented, and coordinated agronomic and water management studies. Defined work programs and directed staff. Conceived new projects, developed proposals, and prepared final reports. Directed irrigation and fertility management programs for farm clients. Prepared and presented educational seminars and workshops for growers and related industry groups.

- < Planned, directed, and cooperated in agronomic studies pertaining to irrigation, drainage, and salinity in the San Joaquin and Coachella Valleys of California.
- < Conducted technical investigations and provided expert testimony in several litigations involving irrigation, soil remediation, and crop production.
- < Experienced with production of most field, row, forage, fruit, and nut crops.

USDA-ARS AND UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA

Research Agronomist & Assistant Professor, 1983 to 1988

Conducted research to develop criteria for evaluating nutritive value of forage crops. Cooperated in plant physiology and genetic studies to develop improved germplasm and management practices for native forages.

- < Planned and initiated a new forage crops research program. Hired, trained, directed, and evaluated technical personnel.
- < Organized or cooperated in multi-disciplinary studies involving forage crop seeding rates, herbicide tolerance in native grasses, forage residue utilization, and genetic improvement of grasses.
- < Established a new laboratory program using near infrared reflectance scanning (NIRS) technology for evaluation of crop quality components.

EXPERIENCE (CONTINUED)

- < Prepared operating budgets, planned expenditures, and managed purchasing and accounting functions for research program.
- < Organized and directed senior seminar course in forage sciences. Participated in teaching and served on graduate student advisory committees.

- < Authored or co-authored several research publications and served as manuscript reviewer for scientific journals.

TEACHING EXPERIENCE

- 1994 to 1996 REEDLEY COLLEGE, REEDLEY, CALIFORNIA.
Part-time Instructor, Plant Sciences. Landscape Horticulture, Agriculture, and Natural Resources (LAND) Department.
- 1983 to 1988 UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA.
Adjunct Assistant Professor, Department of Agronomy. Conducted senior seminar courses, assisted with teaching of forage and animal science courses, served on graduate student advisory committees.
- 1978 to 1983 COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO.
Graduate Research Assistant, Department of Soils & Crop Sciences. Student teaching assignments in forage crops courses and lab.

PROFESSIONAL AFFILIATIONS AND LICENSES

American Society of Agronomy Crop Science Society of America
Soil Science Society of America Gamma Sigma Delta (Honor Society)
Sigma Xi, The Scientific Research Society
California Community College Instructor Credential, Certification #18768
Certified Crop Advisor (CCA) - California and National, License #11190

EDUCATION

COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO
Ph.D., Agronomy, 1983
Inducted into Sigma Xi and Gamma Sigma Delta. Research related to physiology and biochemistry of forage crops and forage nutritive value.

COLORADO STATE UNIVERSITY, FORT COLLINS, COLORADO
M.S., Agronomy, 1981
Research related to physiology and production of forage crops. Developed revised recommendations for management of forage legumes in eastern Colorado.

CALIFORNIA POLYTECHNIC STATE UNIVERSITY, SAN LUIS OBISPO, CALIFORNIA
B.S., Crop Science, 1978
Active participant in the Crop Science club. Awarded Dean's list for academic achievement during each quarter of attendance (8 quarters).

ADDITIONAL EDUCATION

UNIVERSITY OF CALIFORNIA, DAVIS. *Precision Farming in Tree and Vine Crops Short Course.* March 29, 2001, Davis, California.

UNIVERSITY OF CALIFORNIA, DAVIS. *Recent Advances in Table Grape Production. Viticulture Short Course.* November 30 - December 2, 1998, Visalia, California.

ESRI AND VESTRA RESOURCES, INC. *GIS/GPS Applications for Agriculture.* February 10, 1998, Tulare, California.

UNIVERSITY OF CALIFORNIA, DAVIS. *Advances in Irrigation Short Course*. December 2, 1997, Parlier, California.

CALIFORNIA FARM PRESS AND EDISON INTERNATIONAL AGRICULTURAL TECHNOLOGY APPLICATION CENTER. *Remote Sensing/GPS Technology: Eyes in the Sky Looking Out for Agriculture*. February 11, 1997, Tulare, California

CALIFORNIA WATER ENVIRONMENT ASSOCIATION. *Biosolids Land Application Training Course*. December 2 - 3, 1996, Visalia, California.

UNIVERSITY OF CALIFORNIA, DAVIS. *Pistachio Irrigation and Nutrition Short Course*. November 14, 1996, Parlier, California.

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION, TULARE COUNTY. *Internet for Ag Producers*. November 12 - 13, 1996, Visalia, California.

UNIVERSITY OF CALIFORNIA, DAVIS. *Advances in Irrigation Short Course*. January 23, 1996, Visalia, California.

IRRIGATION TRAINING AND RESEARCH CENTER. *Fertigation Short Course*. December 16, 1991, California Polytechnic State University, San Luis Obispo.

IRRIGATION TRAINING AND RESEARCH CENTER. *Irrigation System Evaluation Short Course*. September 6 - 8, 1989, California Polytechnic State University, San Luis Obispo.

PROFESSIONAL IMPROVEMENT ACTIVITIES

CROP SCIENCE SOCIETY OF AMERICA AND AMERICAN SOCIETY OF AMERICA. *Young Crop Scientist Award Committee*. Service during 1985 and 1986.

AMERICAN SOCIETY OF AGRONOMY, NORTH CENTRAL REGION. *Steering and Planning Committee, Annual Meetings*. 1986, Lincoln, Nebraska.

AMERICAN SOCIETY OF AGRONOMY. *Organization, Policy, & Bylaws Committee*. Service from 2000 through 2003.

NATIONAL AND REGIONAL SCIENTIFIC SOCIETIES. Participation in numerous conferences and symposia since 1979. Manuscript reviewer for various scientific journals since 1983.

PUBLICATIONS

GABRIELSEN, B. C., D. H. SMITH AND C. E. TOWNSEND. 1981. *The effect of cutting frequency on yield, quality and carbohydrate reserves of two forage legumes*. Agron. Abstr. P. 131.

GABRIELSEN, B. C., AND D. H. SMITH. 1984. *Ensiling effects of herbage cell wall composition and enzymatic cellulose hydrolysis*. Agron. Abstr. p. 158.

GABRIELSEN, B. C. 1985. *Evaluation of commercial cellulases for activity and capacity to degrade forage*. Agron. Abstr. p. 125.

GABRIELSEN, B. C., D. H. SMITH AND C. E. TOWNSEND. 1985. *Cicer milkvetch and alfalfa as influenced by two cutting schedules*. Agron. J. 77:416-422.

MACIEL, G. E., J. F. HAW, D. H. SMITH, B. C. GABRIELSEN AND G. R. HATFIELD. 1985.

Carbon-13 nuclear magnetic resonance of herbaceous plants and their components using cross polarization and magic-angle spinning. *J. Agric. Food Chem.* 33:185-191.

VOGEL, K. P., AND B. C. GABRIELSEN. 1985. *Breeding for improved quality in forage grasses.* p. 15-20. In *Marketing and managing hay and pasture.* Proc. Nebraska Forage and Grassland Coun., Lincoln, Nebraska. January 1985.

VOGEL, K. P., F. A. HASKINS, H. J. GORZ, B. E. ANDERSON, J. K. WARD, R. BRITTON AND B. C. GABRIELSEN. 1985. *Breeding switchgrass for improved animal performance.* Agron. Abstr. p. 73.

GABRIELSEN, B. C. 1986. *Evaluation of marketed cellulases for activity and capacity to degrade forage.* Agron. J. 78:838-842.

VOGEL, K. P., AND B. C. GABRIELSEN. 1986. *Potential for improving native warm-season grasses by breeding.* p. 38-51. In *Warm-season grasses: Facts and fantasy.* Proc. Four-State Grassland Management Workshop. Northwest Missouri State University, Maryville, Missouri. July 1986.

VOGEL, K. P., AND B. C. GABRIELSEN. 1986. *Breeding to improve native warm-season grasses.* p. 27-34. In *Warm-season grasses: Balancing forage programs in the northeast and southern corn belt.* Proc. Soil Conserv. Soc. Am. annual meeting, St. Louis, Missouri. Soil Conserv. Soc. Am., Ankeny, IA.

GABRIELSEN, B. C., K. P. VOGEL, B. E. ANDERSON AND J. K. WARD. 1987. *Soluble lignin phenolics and forage composition in switchgrass strains during grazing.* Agron. Abstr. p. 142.

LINDEN, J. C., L. L. HENCK, V. G. MURPHY, D. H. SMITH, B. C. GABRIELSEN, R. P. TINGERDY AND L. CZAKO. 1987. *Preservation of potential fermentables in sweet sorghum by ensiling.* Biotechnol. Bioeng. 30:860-867.

GABRIELSEN, B. C., K. P. VOGEL AND D. KNUDSEN. 1988. *Comparison of in vitro dry matter digestibility and cellulase digestion for deriving near infrared reflectance spectroscopy calibration equations using cool-season grasses.* Crop Sci. 28:44-47. PUBLICATIONS (Continued)

GABRIELSEN, B. C., K. P. VOGEL, B. E. ANDERSON AND J. K. WARD. 1990. *Alkali-labile lignin phenolics and forage quality in three switchgrass strains selected for differing digestibility.* Crop Sci. 30:1313-1320.

VOGEL, K.P., B.C. GABRIELSEN, J.K. WARD, B.E. ANDERSON, H.F. MAYLAND AND R.A. MASTERS. 1991. *Evaluation of crested wheatgrasses for cattle gains, forage quality, and persistence in pastures in Nebraska.* Soc. Range Management Abstracts p. 30.

VOGEL, K.P., B.C. GABRIELSEN, J.K. WARD, B.E. ANDERSON, H.F. MAYLAND AND R.A. MASTERS. 1992. *Forage quality, mineral constituents, and performance of beef yearlings grazing two crested wheatgrasses.* Agron. J. 85:584-590.

TECHNICAL REPORTS

GABRIELSEN, B.C. 1990. *Soil reclamation program and cost estimate for proposed golf course site in the city of Lancaster.* Prepared for the Department of Parks, Recreation, and Arts, Lancaster, California. JMLord, Inc., Fresno, CA. 13p.

GABRIELSEN, B.C. 1990. *Summary Report: Investigation of groundwater salt intrusion and crop damage*. Prepared as part of a litigation involving farmers, the Lindsay Olive Growers Association, and the city of Lindsay, California. JMLord, Inc., Fresno, CA. 68p.

GABRIELSEN, B.C., J.M. LORD AND B. WESTFALL. 1990. *Controlled drainage. Technical Memorandum, San Luis Unit Drainage Program*. Prepared for the U.S. Bureau of Reclamation. JMLord, Inc., Fresno, CA. 26p.

GABRIELSEN, B.C., J.M. LORD AND B. WESTFALL. 1990. *Drainwater recycling. Technical Memorandum, San Luis Unit Drainage Program*. Prepared for the U.S. Bureau of Reclamation. JMLord, Inc., Fresno, CA. 15p.

GABRIELSEN, B.C., J.M. LORD AND B. WESTFALL. 1990. *Shallow drainage. Technical Memorandum, San Luis Unit Drainage Program*. Prepared for the U.S. Bureau of Reclamation. JMLord, Inc., Fresno, CA. 22p.

GABRIELSEN, B.C. 1991. *Salinity effects on permanent crops*. The AgInformer, Vol. 7, No. 1. Crop production newsletter published quarterly by JMLord, Inc., Fresno, CA.

GABRIELSEN, B.C. AND R. LUKENS. 1991. *Crop and irrigation system assessment for Jentana Corporation (Los Banos farm)*. JMLord, Inc., Fresno, CA. 14p.

REYNOLDS, L.D., GABRIELSEN, B.C., STEINBERG, M. AND J.M. LORD. 1991. *AICO Madera Ltd. management study. An assessment of farming operations and recommendations for improvement*. JMLord, Inc., Fresno, CA. 13p.

GABRIELSEN, B.C. 1992. *Drip irrigation and salinity management*. The AgInformer Vol. 8, No. 2. Crop production newsletter published quarterly by JMLord, Inc., Fresno, CA.

TECHNICAL REPORTS (Continued)

GABRIELSEN, B.C., K. WREN AND L.D. REYNOLDS. 1992. *Crane walnut orchards micro irrigation project. Phase I report*. JMLord, Inc., Fresno, CA. 15p.

BANKS, H.O., J.M. LORD, B.C. GABRIELSEN, L.D. REYNOLDS, G.E. FOGG, G.T. O'NEILL, D. WICHELS AND J.O. WILLIAMS. 1993. *Special critique of on-farm irrigation efficiency. Special technical report, Coachella Valley Water District*. H.O. Banks Engineer Consultant, Inc., Belmont, CA. 32 p.

GABRIELSEN, B.C. 1993. *Coachella Valley Water District soil salinity survey. Prepared for the Coachella Valley Water District, Coachella, CA*. JMLord, Inc., Fresno, CA. 34p.

GABRIELSEN, B.C. 1993. *Maintenance of micro irrigation systems*. The AgInformer Vol. 9, No. 2. Crop production newsletter published quarterly, JMLord, Inc., Fresno, CA.

GABRIELSEN, B.C. 1993. *Understanding crop water requirements*. The AgInformer Vol. 9, No. 1. Crop production newsletter published quarterly, JMLord, Inc., Fresno, CA.

GABRIELSEN, B.C., K. WREN AND L.D. REYNOLDS. 1993. *JCM Farming (Mid-Cal Ranch) micro irrigation project. Phase I report*. JMLord, Inc., Fresno, CA. 19p.

GABRIELSEN, B.C., K. WREN AND L.D. REYNOLDS. 1993. *Met-West Agribusiness sub-surface micro irrigation project. Phase I report*. JMLord, Inc., Fresno, CA. 18p.

GABRIELSEN, B.C., K. WREN AND L.D. REYNOLDS. 1993. *Stewart property. Orchard assessment and recommendations. Phase I report.* JMLord, Inc., Fresno, CA. 24p.

GABRIELSEN, B.C. 1994. *Arvin-Edison Water Storage District assessment of reasonable water requirements.* Prepared for the Arvin-Edison Water Storage District, Arvin, CA. JMLord, Inc., Fresno, CA. 30p.

GABRIELSEN, B.C. 1994. *Fresno Irrigation District assessment of reasonable water requirements.* Prepared for the Fresno Irrigation District, Fresno, CA. JMLord, Inc., Fresno, CA. 29p.

GABRIELSEN, B.C. 1994. *Shafter-Wasco Irrigation District assessment of reasonable water requirements.* Prepared for the Shafter-Wasco Irrigation District, Wasco, CA. JMLord, Inc., Fresno, CA. 26p.

GABRIELSEN, B.C. 1994. *Sampling soil and water for optimum production.* The AgInformer Vol. 10, No. 2. Crop production newsletter published quarterly by JMLord, Inc., Fresno, CA.

GABRIELSEN, B.C., AND J.M. LORD. 1994. *Evaluation of soil and water resources at Rio Seco Ranch.* Prepared for AICO Madera, Ltd. JMLord, Inc., Fresno, CA. 22p.

GABRIELSEN, B.C., J.M. LORD, AND L.D. REYNOLDS. 1994. *Coachella Valley Water District salinity conditions and management options.* Prepared for the Coachella Valley Water District, Coachella, CA. JMLord, Inc., Fresno, CA. 33p.
TECHNICAL REPORTS (Continued)

GABRIELSEN, B.C., J.M. LORD, AND L.D. REYNOLDS. 1994. *Overview report: Coachella Valley Water District.* Prepared for the Coachella Valley Water District, Coachella, CA. JMLord, Inc., Fresno, CA. 53p.

GABRIELSEN, B.C. 1995. *Estate of Demetra Pappas. Assessment of agronomic factors pertaining to farming operations from 1982 through 1991.* Report prepared as part of a litigation involving the Pappas estate located near Mendota, CA. 91p.

GABRIELSEN, B.C. 1997. *Economic assessment of pistachio production at Bear Creek Ranch.* Prepared as part of a land-rezoning proposal pertaining to a large pistachio planting near Planada, CA. 22p.

GABRIELSEN, B.C. 1997. *Summary Report, Plum Orchard, Belridge Farms.* Prepared for Ballantine Produce Company, Inc., Sanger, CA 18p.

GABRIELSEN, B.C. 1999. *Santa Barbara Pistachio Ranch & Maple Leaf Pistachio Ranch. Soil chemistry assessment and field observations.* Prepared as part of a litigation between pistachio growers and the Chowchilla Water District, Chowchilla, CA. 36p.

GABRIELSEN, B.C. 1999. *Observation and assessment of farm properties in the Dinuba and Parlier region.* Prepared for Ballantine Produce Company, Inc., Sanger, CA 12p.

AGRONOMIC LITIGATION SUPPORT EXPERIENCE

F & L FARM COMPANY ET AL. VS. LINDSAY OLIVE GROWERS ASSOCIATION, CITY OF LINDSAY.

1991. Agronomic investigation, deposition, and trial testimony for the plaintiff concerning water quality, soil and irrigation management, crop production practices, and soil reclamation. Judgment for plaintiff, April 1991.

STOCKTON TERMINAL RAILROAD COMPANY VS. P.G. & E. ET AL. Agronomic investigation and deposition testimony for the plaintiff pertaining to water management and almond production. Pre-trial settlement, April 1992.

PRUDENTIAL PROPERTIES VS. MUNSON AND BEARD. Agronomic investigation and deposition testimony for the defendant pertaining to water and fertility management for almonds. Pre-trial settlement, April 1992.

U.S. DEPT. OF JUSTICE (TORRES-MARTINEZ INDIAN RESERVATION) VS. IMPERIAL IRRIGATION DISTRICT (IID) AND COACHELLA VALLEY WATER DISTRICT (CVWD). Agronomic investigation for defendant (CVWD) to assess crop water requirements, evaluate soils for crop suitability, develop salinity management soil reclamation procedures, and assess drainage outflows. Judgment for plaintiff, July 1992.

U.S. CORPS OF ENGINEERS VS. CRANE ET AL. Agronomic investigation, deposition, and trial testimony for the defendant concerning agricultural land suitability, crop production requirements, soil classification, salinity management, and soil reclamation. Judgment for defendant, April 1993.

AGRONOMIC LITIGATION SUPPORT EXPERIENCE (Continued)

ESTATE OF DEMETRA PAPPAS VS. PHILON P. PAPPAS COMPANY, GEORGE PAPPAS, AND PAPPAS AND KAVALOS. Agronomic investigation, deposition, and trial testimony for the defendant concerning farming practices, evaluation of soil and water resources, and related crop production issues. Judgment for defendant, March 1996.

GILA RIVER AND LITTLE COLORADO RIVER ADJUDICATIONS. General adjudication of all rights to use water in the Gila River and Little Colorado River systems and source. Retained for agronomic investigation and PIA analysis by the Salt River Project Agricultural Improvement and Power District and the Salt River Valley Water Users Association, Phoenix, AZ, June 1998 (Ongoing).

LOPES VS. LINDEMANN PRODUCE. Agronomic investigation for the defendant pertaining to honeydew melon production and related crop production issues. Pre-trial settlement, August 1998.

SANTA BARBARA PISTACHIO RANCH, ET AL. VS. CHOWCHILLA WATER DISTRICT. Agronomic investigation and deposition testimony for the defendant pertaining to disease infestation and soil properties in pistachios. Judgment for summary dismissal in favor of defendant, February 1999.

FRASIER IRRIGATION VS. SUKHJIT NAHAL, ET AL. Agronomic investigation and deposition testimony for the defendant pertaining to grape and apple production, particularly with regard to irrigation, water management, and water stress. Pre-trial settlement, May 1999.

ARIZONA VS. CALIFORNIA. General adjudication of Colorado River water allocations concerning the Quechan Tribal lands (Fort Yuma Indian Reservation). Retained for agronomic investigation and PIA analysis by The Metropolitan Water District of Southern California, November 2001 (On-going).

DALE DIR, ET AL. VS. RUSSELL SPALDING, ET AL. Agronomic investigation, deposition, and trial testimony for the plaintiff pertaining to citrus orchard establishment and irrigation management. Judgment for plaintiff, February 2003.